

THAT WHICH IS CLAIMED IS:

1. A multi-mode integrated circuit (IC) for
operating in an ISO mode in accordance with
International Standards Organization 7816 (ISO 7816)
5 protocol, and a non-ISO mode in accordance with a
non-ISO protocol, the multi-mode IC comprising:
a microprocessor;
an external interface connected to the
microprocessor and comprising
10 a voltage supply pad,
a ground pad,
a first set of pads in accordance with the
ISO 7816 protocol, and
a second set of pads in accordance with the
15 non-ISO protocol; and
a mode configuration circuit connected to the
switching block for configuring the multi-mode IC in
one of the ISO mode and the non-ISO mode based upon a
signal on one pad of the first set of pads.
2. A multi-mode IC according to Claim 1 wherein
the mode configuration circuit configures the multi-
mode IC to operate in one of the ISO and non-ISO
modes while disabling the other of the ISO and non-
5 ISO modes.
3. A multi-mode IC according to Claim 2 wherein
the first set of pads is disabled when the multi-mode
IC is configured in the non-ISO mode, and the second
set of pads is disabled when the multi-mode IC is
5 configured in the ISO mode.
4. A multi-mode IC according to Claim 1 wherein
the mode configuration circuit comprises:

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a latching circuit connected to the
microprocessor and receiving an output from the mode
5 detector.

5. A multi-mode IC according to Claim 4 further comprising a control register connected to the latching circuit for storing a mode configuration indicator.

6. A multi-mode IC according to Claim '4 further comprising a voltage detector connected to the voltage supply pad to detect a voltage supply of one of the ISO and non-ISO modes.

7. A multi-mode IC according to Claim 4 wherein the non-ISO mode comprises a Universal Serial Bus (USB) mode, and the second set of pads includes D-plus and D-minus pads in accordance with the USB protocol; and further comprising a USB cable detector

5 connected to the D-plus and D-minus pads.

8. A multi-mode IC according to Claim 4 wherein the first set of pads includes a clock pad, a reset pad, and an input/output pad in accordance with the ISO 7816 protocol.

9. A multi-mode IC according to Claim 4 wherein the first set of pads includes a clock pad, a reset pad, a variable supply voltage pad, and an input/output pad in accordance with the ISO 7816 protocol; and wherein the mode detector comprises a pull-up resistor connected to the one pad of the first set of pads.

10. A multi-mode smart card for operating in an ISO mode in accordance with International Standards Organization 7816 (ISO 7816) protocol, and a non-ISO mode in accordance with a non-ISO protocol, the
5 multi-mode smart card comprising:

a card body; and

a multi-mode integrated circuit (IC) carried by the card body and comprising

an external interface including

10 a voltage supply pad,

a ground pad,

a first set of pads in accordance with the ISO 7816 protocol, and

15 a second set of pads in accordance with the non-ISO protocol, and

a mode configuration circuit for configuring the multi-mode IC in one of the ISO mode and the non-ISO mode and comprising

20 a mode detector connected to one pad of the first set of pads, and

a latching circuit connected to the mode detector.

11. A multi-mode smart card according to Claim 10 further comprising a control register connected to the latching circuit for storing a mode configuration indicator.

12. A multi-mode smart card according to Claim 10 further comprising a voltage detector connected to the voltage supply pad to detect a voltage supply of one of the ISO and non-ISO modes.

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13. A multi-mode smart card according to Claim
10 wherein the non-ISO mode comprises a Universal
Serial Bus (USB) mode, and the second set of pads
includes D-plus and D-minus pads in accordance with
5 the USB protocol; and further comprising a USB cable
detector connected to the D-plus and D-minus pads.

14. A multi-mode smart card according to Claim
10 wherein the mode configuration circuit configures
the multi-mode IC to operate in one of the ISO and
non-ISO modes while disabling the other of the ISO
5 and non-ISO modes.

15. A multi-mode smart card according to Claim
14 wherein the first set of pads is disabled when the
multi-mode IC is configured in the non-ISO mode, and
the second set of pads is disabled when the multi-
5 mode IC is configured in the ISO mode.

16. A multi-mode smart card according to Claim
10 wherein the first set of pads includes a clock
pad, a reset pad, and an input/output pad in
accordance with the ISO 7816 protocol.

17. A multi-mode smart card according to Claim
10 wherein the first set of pads includes a clock
pad, a reset pad, a variable supply voltage pad, and
an input/output pad in accordance with the ISO 7816
5 protocol; and wherein the mode detector comprises a
pull-up resistor connected to the one pad of the
first set of pads.

18. A multi-mode smart card system for
operating in an ISO mode in accordance with
International Standards Organization 7816 (ISO 7816)

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protocol, and a non-ISO mode in accordance with a non-ISO protocol, the multi-mode smart card system comprising:

- a multi-mode smart card comprising
 - 5 an external interface including
 - a voltage supply pad,
 - a ground pad,
 - a first set of pads in accordance with the ISO 7816 protocol, and
 - 10 a second set of pads in accordance with the non-ISO protocol, and
 - a mode configuration circuit for configuring the multi-mode smart card in one of the ISO mode and the non-ISO mode and comprising
 - 15 a mode detector connected to one pad of the first set of pads, and
 - a latching circuit connected to the mode detector; and
 - a non-ISO-compliant smart card reader for
 - 20 reading the multi-mode smart card including
 - a smart card interface having a plurality of contacts for respectively mating with the voltage supply pad, the ground pad, and the second set of pads in accordance with the non-
 - 25 ISO protocol, and
 - a mode indication circuit for connection to the one pad of the first set of pads for providing a non-ISO mode indication signal to the mode detector of the mode configuration
 - 30 circuit.

19. A multi-mode smart card system according to Claim 18 wherein the mode configuration circuit further comprises a control register connected to the latching circuit for storing a mode configuration

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indicator.

20. A multi-mode smart card system according to Claim 18 wherein the mode configuration circuit further comprises a voltage detector connected to the voltage supply pad to detect a voltage supply of one
5 of the ISO and non-ISO modes.

21. A multi-mode smart card system according to Claim 18 wherein the non-ISO mode comprises a Universal Serial Bus (USB) mode, and the second set of pads includes D-plus and D-minus pads in
5 accordance with the USB protocol.

22. A multi-mode smart card system according to Claim 18 wherein the mode configuration circuit configures the multi-mode IC to operate in one of the ISO and non-ISO modes while disabling the other of
5 the ISO and non-ISO modes.

23. A multi-mode smart card system according to Claim 22 wherein the first set of pads is disabled when the multi-mode IC is configured in the non-ISO mode, and the second set of pads is disabled when the
5 multi-mode IC is configured in the ISO mode.

24. A multi-mode smart card system according to Claim 18 wherein the first set of pads includes a clock pad, a reset pad, and an input/output pad in accordance with the ISO 7816 protocol.

25. A multi-mode smart card system according to Claim 18 wherein the first set of pads includes a clock pad, a reset pad, a variable supply voltage pad, and an input/output pad in accordance with the

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ISO 7816 protocol; and wherein the mode detector comprises a pull-up resistor connected to the one pad of the first set of pads.

26. A method of operating a multi-mode integrated circuit (IC) in an ISO mode in accordance with International Standards Organization 7816 (ISO 7816) protocol, and a non-ISO mode in accordance with
- 5 a non-ISO protocol, the multi-mode IC including an external interface having a voltage supply pad, a ground pad, a first set of pads in accordance with the ISO protocol, and a second set of pads in accordance with the non-ISO protocol, the method
- 10 comprising:
- detecting whether one of an ISO-mode condition and a non-ISO-mode condition exists on one pad of the first set of pads;
 - configuring the multi-mode IC in the ISO mode

15 and disabling the second set of pads when the ISO-mode condition is detected; and

 - configuring the multi-mode IC in the non-ISO mode and disabling the first set of pads when the non-ISO-mode condition is detected.

27. A method according to Claim 26 wherein
- detecting whether one of the ISO-mode condition and the non-ISO-mode condition exists on the one pad of the first set of pads comprises detecting whether
- 5 one of the ISO-mode condition and the non-ISO-mode condition exists during a power-on-reset of the multi-mode IC.

28. A method according to Claim 26 further comprising verifying the non-ISO mode, when the non-ISO-mode condition is detected, by detecting a non-

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ISO-mode voltage on the voltage supply pad.

29. A method according to Claim 26 wherein the first set of pads comprises a reset pad, a clock pad and an input/output pad in accordance with the ISO 7816 protocol.

30. A method according to Claim 29 wherein detecting whether the ISO-mode or non-ISO-mode condition exists comprises detecting if a signal from one of an ISO-compliant interface and a non-ISO-compliant interface is present on the clock pad.

31. A method according to Claim 26 wherein the first set of pads includes a clock pad, a reset pad, a variable supply voltage pad, and an input/output pad in accordance with the ISO 7816 protocol.

32. A method according to Claim 26 wherein the non-ISO protocol comprises a Universal Serial Bus (USB) protocol.

33. A method according to Claim 26 further comprising storing a mode configuration indicator for indicating whether the multi-mode IC is configured in the ISO or non-ISO mode.

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